

# ***FCC TEST REPORT***

**FCC ID** : Q6N149EL

**Applicant** : **EDU-SCIENCE ( HK ) LIMITED**

**Address** : Suite 701-703 Wing On Plaza TST East,Kowloon Hong Kong

## **Equipment Under Test (EUT) :**

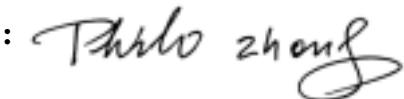
Product description :RC Crawlers(Scorpion/Tarantula)

Model No. : EL149/EL150

**Standards** : FCC 15 Paragraph 15.205, Paragraph 15.209, Paragraph 15.227, Paragraph 15.31, Paragraph 15.33, Paragraph 15.35.

**Date of Test** : Mar.22, 2006

**Test Engineer** : Tiger Su

**Reviewed By** : 

PERPARED BY:  
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## 2 Contents

	Page
1 COVER PAGE.....	1
2 CONTENTS .....	2
3 TEST SUMMARY.....	4
4 GENERAL INFORMATION.....	5
4.1 CLIENT INFORMATION .....	5
4.2 GENERAL DESCRIPTION OF E.U.T.....	5
4.3 DETAILS OF E.U.T. .....	5
4.4 DESCRIPTION OF SUPPORT UNITS .....	5
4.5 STANDARDS APPLICABLE FOR TESTING.....	5
4.6 TEST FACILITY.....	6
4.7 TEST LOCATION.....	6
5 EQUIPMENT USED DURING TEST .....	7
6 CONDUCTED EMISSION TEST .....	8
6.1 TEST EQUIPMENT.....	8
6.2 TEST PROCEDURE .....	8
6.3 CONDUCTED TEST SETUP .....	9
6.4 EUT OPERATING CONDITION .....	9
6.5 CONDUCTED EMISSION LIMITS .....	10
6.6 CONDUCTED EMISSION TEST RESULT.....	10
7 RADIATION EMISSION TEST.....	11
7.1 TEST EQUIPMENT.....	11
7.2 MEASUREMENT UNCERTAINTY.....	11
7.3 TEST PROCEDURE .....	11
7.4 RADIATED TEST SETUP.....	12
7.5 SPECTRUM ANALYZER SETUP.....	12
7.6 CORRECTED AMPLITUDE & MARGIN CALCULATION .....	13
7.7 SUMMARY OF TEST RESULTS.....	13
7.8 EUT OPERATING CONDITION .....	14
7.9 RADIATED EMISSIONS LIMIT.....	14
7.10 RADIATED EMISSIONS TEST RESULT.....	15
8 OCCUPIED BANDWIDTH .....	17
8.1 TEST PROCEDURE .....	17
9 PHOTOGRAPHS OF TESTING SET UP .....	18
9.1 RADIATION EMISSION TEST VIEW .....	18
10 PHOTOGRAPHS - CONSTRUCTIONAL DETAILS .....	19
10.1 EUT -FRONT VIEW .....	19
10.2 EUT - BACK VIEW .....	19

10.3	PCB – COMPONENT VIEW .....	20
10.4	PCB – SOLDER VIEW.....	20
<b>11</b>	<b>FCC ID LABEL.....</b>	<b>21</b>

### 3 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (25MHz to 1GHz)	FCC PART 15: 2003	ANSI C63.4: 2003	Class B	PASS
Conducted Emission (150KHz to 30MHz)	FCC PART 15: 2003	ANSI C63.4: 2003	Class B	N/A

## 4 General Information

### 4.1 Client Information

Applicant: **EDU-SCIENCE ( HK ) LIMITED**  
Address of Applicant: Suite 701-703 Wing On Plaza TST East,Kowloon Hong Kong

### 4.2 General Description of E.U.T.

Product description: RC Crawlers(Scorpion/Tarantula)  
Model No.: EL149/EL150

### 4.3 Details of E.U.T.

Power Supply: Transmitter :9.0V DC Battery

### 4.4 Description of Support Units

The EUT has been tested as an independent device unit

### 4.5 Standards Applicable for Testing

The customer requested FCC tests for a RC Crawlers(Scorpion/Tarantula). The standards used were FCC 15 Paragraph 15.205, Paragraph 15.209, Paragraph 15.227,Paragraph 15.31,Paragraph 15.33, Paragraph 15.35.

#### **4.6 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC – Registration No.: 97379**

Shenzhen Academy Of Metrology and Quality Inspection EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 973379.

#### **4.7 Test Location**

All Emissions tests were performed at:-

Bldg.of Metrology and Quality Inspection ,Longzhu Road ,Nanshan District ,Shenzhen ,Guangdong ,China

## 5 Equipment Used during Test

Equipment	Brand Name	Model	Cal. Int Months	Last Cal. Date
<b>3m Anechoic chamber</b>				
3m Semi- Anechoic Chamber	Albatross Projects	9X6X6	12	2005-08
EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	12	2005-08
EMI Test Software	ROHDE & SCHWARZ	ES-K1	12	2005-08
Coaxial cable	SMQ	N/A	12	2005-08
Bilog Antenna	Chase	CBL6112B	12	2005-08
LOOP Antenna	R&S	6108	12	2005-08
Horn Antenna	ROHDE & SCHWARZ	HF906	12	2005-08
RF Selector	TOYO	NS4901A	-	-
Turn Disc	HD	DS4150S	-	-
Antenna Mast	HD	MA2400	-	-
<b>EMI Shielded Room</b>				
CE Variac	GZ Debao Factory	TS/DGC <sub>2</sub> -5	12	2005-08
LISN	SCHAFFNER CHASE	MNZ050D11	12	2005-08
Shielding Room	Frankonia	12 x 4 x 4 m <sup>3</sup>	12	2005-08
EMI Receiver	ROHDE & SCHWARZ	ESCS30	12	2005-08
Coaxial Cable	SMQ	2m	12	2005-08

## 6 Conducted Emission Test

Product Name:	<b>EDU-SCIENCE ( HK ) LIMITED</b>
Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	Based on FCC Part15 Paragraph 15.207
Test Date:	.....
Frequency Range:	150kHz to 30MHz
Class:	Class B
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

### 6.1 Test Equipment

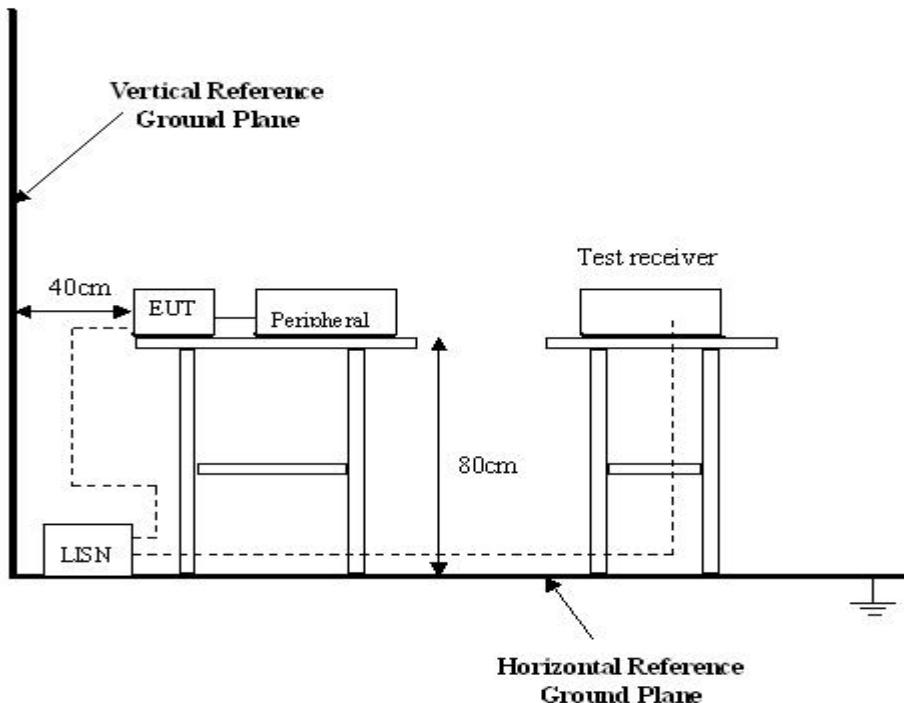
Please refer to Section 5 this report.

### 6.2 Test Procedure

1. The EUT was tested according to ANSI C63.4:2003. The frequency spectrum from 150kHz to 30MHz was investigated.
2. The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

### 6.3 Conducted Test Setup

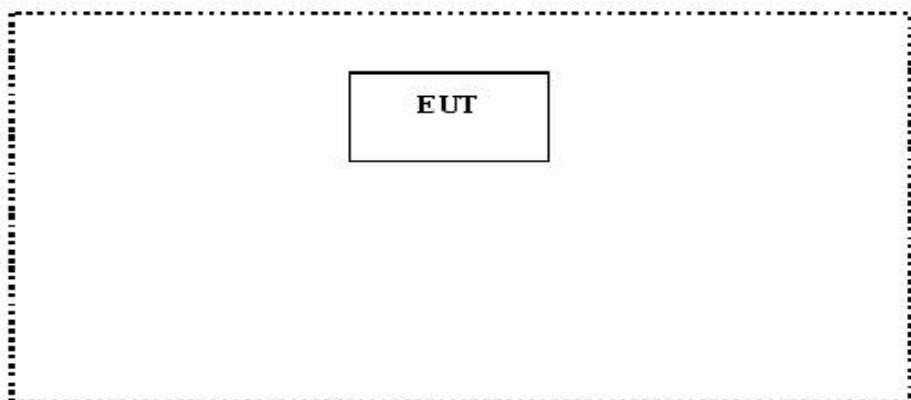
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



### 6.4 EUT Operating Condition

Operating condition is according to ANSI C63.4:2003.

- A. Setup the EUT and simulators as shown on follow.
- B. Enable RF signal and confirm EUT active.
- C. Modulate output capacity of EUT up to specification.



## 6.5 Conducted Emission Limits

66-56 dB $\mu$ V/m between 0.15MHz & 0.5MHz

56 dB $\mu$ V/m between 0.5MHz & 5MHz

60 dB $\mu$ V/m between 5MHz & 30MHz

**Note:** In the above limits, the tighter limit applies at the band edges.

## 6.6 Conducted Emission Test Result

Owing to the DC operation of EUT, this test is not performed.

## 7 Radiation Emission Test

Product Name:	<b>EDU-SCIENCE ( HK ) LIMITED</b>
Test Requirement:	FCC Part15 Paragraph 15.209, Paragraph 15.227
Test Method:	Based on FCC Part15 Paragraph 15.33
Test Date:	Mar.22,2006
Frequency Range:	25MHz to 1GHz
Measurement Distance:	3m
Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximised peak within 6dB of limit

### 7.1 Test Equipment

Please refer to Section 5 this report.

### 7.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

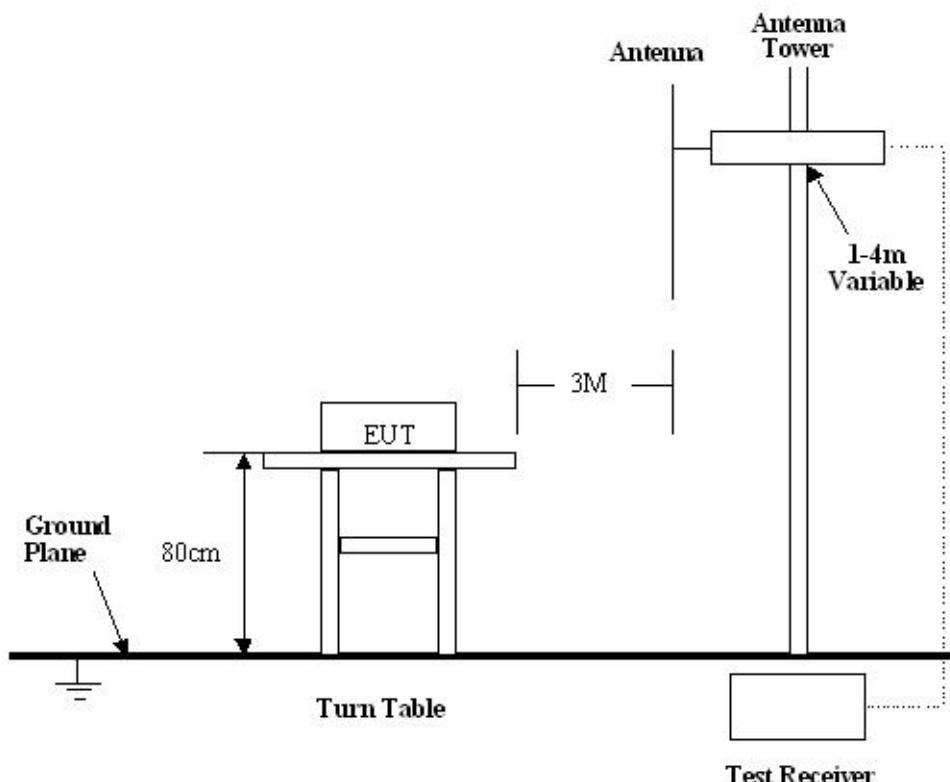
Based on ANSI C63.4:2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Solid EMC Laboratory is +4.0 dB.

### 7.3 Test Procedure

1. For the radiated emissions test, since the EUT does not have a power source, there was no connection to AC outlets.
2. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
3. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB $\mu$ V of specification limits), and are distinguished with a "Qp" in the data table.
4. The EUT was under normal mode during the final qualification test and the configuration was used to represent the worst case results.

## 7.4 Radiated Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.209, Paragraph 15.227 limits.



## 7.5 Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.209, Paragraph 15.227 Rules, the system was tested to 1000 MHz.

Start Frequency .....	25 MHz
Stop Frequency .....	1000 MHz
Sweep Speed	Auto
IF Bandwidth .....	100 kHz
Video Bandwidth .....	1 MHz
Quasi-Peak Adapter Bandwidth .....	120 kHz
Quasi-Peak Adapter Mode .....	Normal
Resolution Bandwidth .....	1MHz

## 7.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of  $-7\text{dB}\mu\text{V}$  means the emission is  $7\text{dB}\mu\text{V}$  below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

## 7.7 Summary of Test Results

According to the data in section 7.10, the EUT complied with the FCC Part15 Paragraph 15.209 and Paragraph 15.227 standards.

## 7.8 EUT Operating Condition

Same as section 6.4 of this report.

## 7.9 Radiated Emissions Limit

### A. FCC Part 15 subpart C Paragraph 15.227 Limit

Fundamental Frequency(MHZ)	Field Strength of Fundamental
	dBuV/m
27.145	80

**Note:**(1) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

### B. Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency(MHZ)	Distance(m)	Field strength(dBuV/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

**Note:** (1) RF Voltage(dBuV)=20 log RF Voltage(uV)  
(2) In the Above Table,the tighter limit applies at the band edges.  
(3) Distance refers to the distance in meters between the measuring instrument antenna.

## 7.10 Radiated Emissions Test Result

Formula of conversion factors: the field strength at 3m was established by adding The meter reading of the spectrum analyser (which is set to read in units of dBuV) To the antenna correction factor supplied by the antenna manufacturer. The antenna Correction factors are stated in terms of dB. The gain of the preselector was accounted For in the spectrum analyser meter reading.

Example:

$$\text{Freq(MHz) Meter Reading +ACF=FS}$$

$$33 \quad 20\text{dBuV} + 10.36\text{dB} = 30.36\text{dBuV/m} @3\text{m}$$

### A. Fundamental Radiated Emission Data for 27.145MHz

Test Item:	Fundamental Radiated Emission Data
Test Voltage:	9.0VDC Battery
Test Mode:	TX On
Temperature:	24 °C
Humidity:	52%RH
Test Result:	PASS

Frequency (MHz)	Antenna Polarization	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
27.145	Vertical	58.02	80.0	21.98	1.5	60
27.145	Horizontal	54.75	80.0	25.25	1.5	120

**B. General Radiated Emission Data**

Test Item: General Radiated Emission Data

Test Voltage: 9.0VDC Battery

Test Mode: TX On

Temperature: 24 °C

Humidity: 52%RH

Test Result: PASS

Frequency (MHz)	Antenna Polarization	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle ( ° )
54.290	Horizontal	18.7	40.0	21.3	1.5	142
81.845	Horizontal	16.5	40.0	23.5	1.8	30
108.580	Horizontal	19.4	43.5	24.1	1.8	60
54.290	Vertical	39.0	40.0	1.0	1.5	60
81.845	Vertical	31.2	40.0	8.8	1.5	45
108.580	Vertical	16.2	43.5	27.3	1.5	209
515.755	Vertical	25.9	46.0	20.1	1.8	45

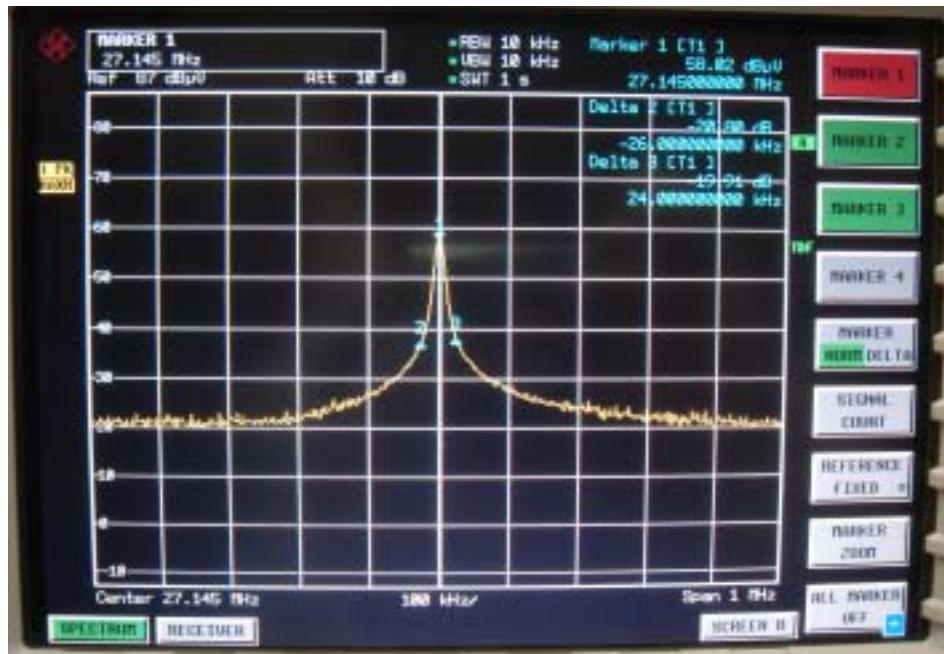
## 8 Occupied Bandwidth

Test Requirement:	FCC Part15 C
Test Method:	Based on FCC Part15 Paragraph 15.227
	Operation within the band 26.65-27.65MHz
Test Date:	Mar.22,2006
Test mode:	TX On
Temperature:	24 °C
Humidity:	52%RH

### 8.1 Test Procedure

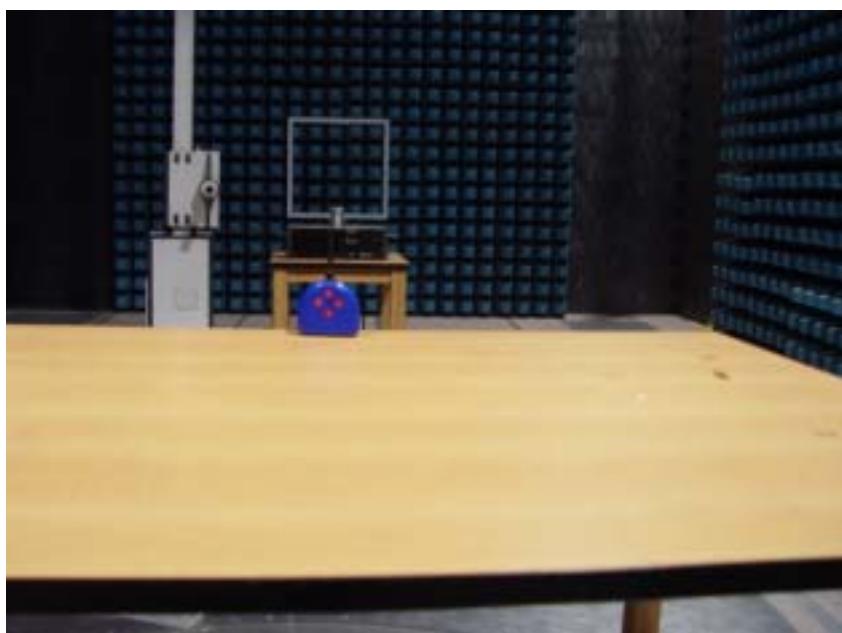
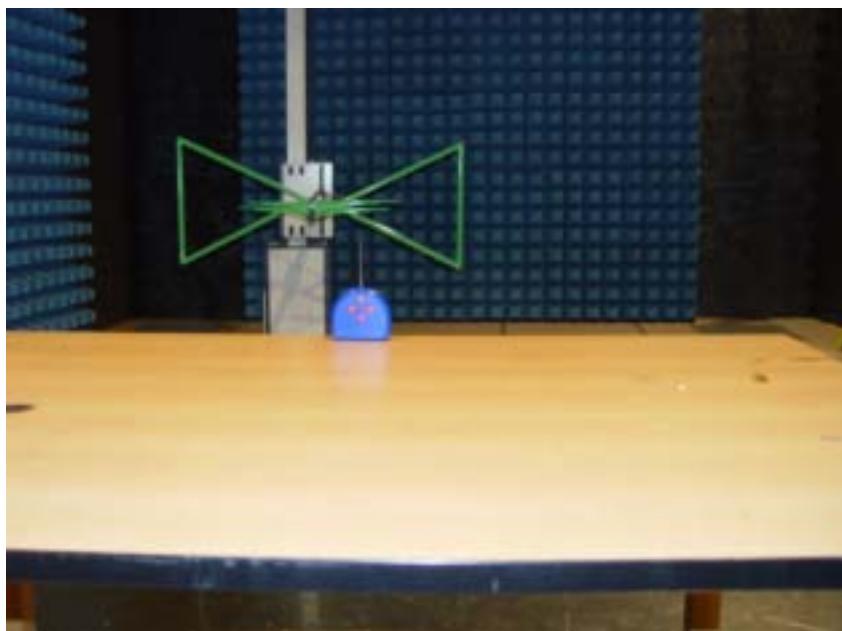
1. The field strength of any emissions which appear outside of the band shall not exceed the general radiated emission limits in section 15.209.
2. The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector.

The graph as below.



## 9 Photographs of Testing set up

### 9.1 Radiation Emission Test View



## 10 Photographs - Constructional Details

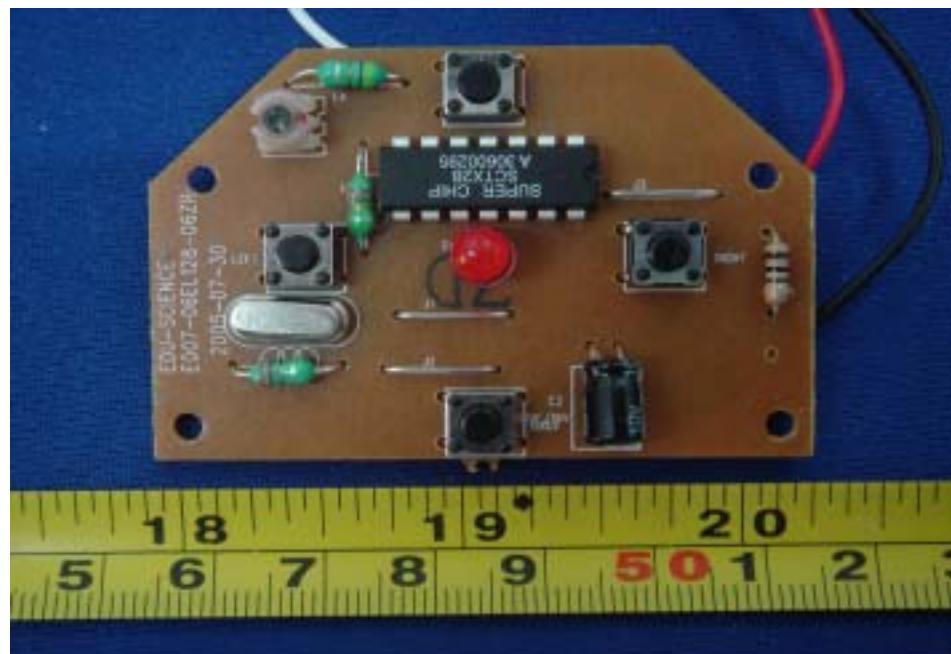
### 10.1 EUT -Front View



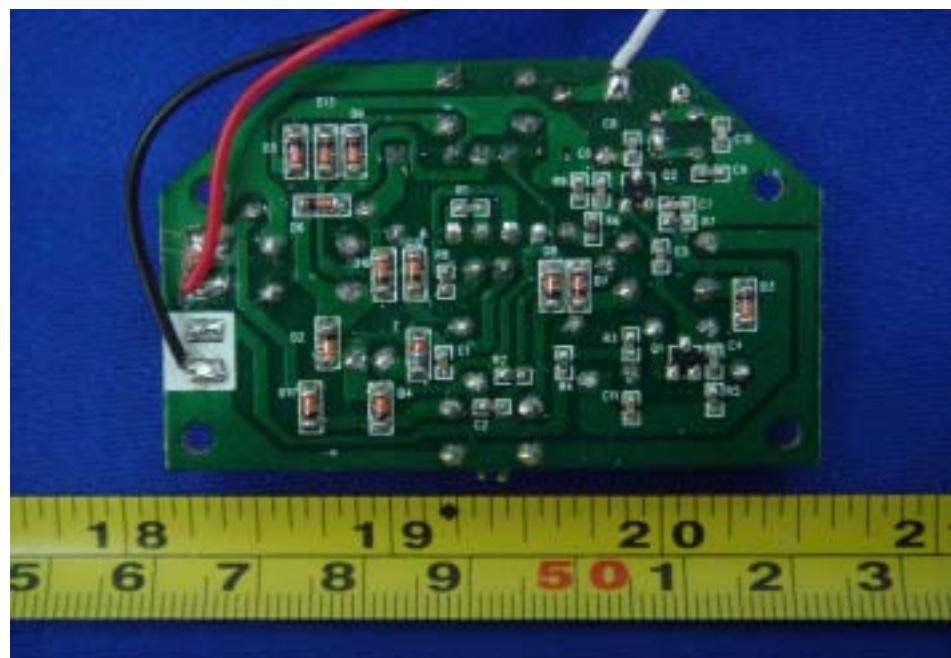
### 10.2 EUT – Back View



### 10.3 PCB – Component View



### 10.4 PCB – Solder View



## 11 FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT  
EUT Bottom View/proposed FCC Mark Location

